"Standardized Designs for Third Generation Ammonia-on-Demand (AOD™) at AEP's Amos and Mountaineer Plants"

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Prototype Installation on 580 MW Mirant Canal Plant 2000 Ozone Season

- First commercial operation of AOD technology installed on a utility SCR
- Performance tests for maximum and minimum production rate, ramp rate, load following and automatic operation passed with no difficulty
- Hydrolyzer performance confirmed design calculations for reaction kinetics
- Instrumentation and control issues successfully worked out

First Large Scale AOD Installation at AEP's 2,600 MW Gavin Plant

- **Process design duplicated Canal due to short project schedule**
- **Large plant required separation of urea unloading, solution preparation locations**
- **Storage of urea solution used to isolate hydrolysis process from maintenance of urea solution and handling system**
- **3 - 50% hydrolysis trains used to insure high availability of the ammonia stream**

AEP's Gavin Station

Train B Hydrolyzer

AOD™ System Process Improvements Developed from Gavin Station Experience

Liquid Carryover	**Redesigned internal separators** **Redesigned interstage baffles** **Improved mist eliminator**
Improved Instrumentation	**Total I/O count reduced** **Redesigned pressure transmitters** **Improved level measurement**
Improved Urea Handling	**Truck and rail delivery of dry urea** **Improved urea mixing** **Higher capacity solution storage** **Temperature control on recycle tank**
Redesigned Components	**Feed pumps replaced with new design** **Process simplified**

Design Objectives for Third Generation AOD Systems in AEP Plants

- Reduce steps in dry urea handling and storage
- Long term storage of reagent as solution
- Minimize number of process skids
- Increase process reliability
- Simplify overall installation
- Reduce capital and installation cost

Design Changes Implemented at Mountaineer

- Elimination of rail delivery, dry urea storage
- Dry urea to be delivered in open dump trucks
- High speed, high capacity dissolving tanks
- 2 - 100% process trains
- Incorporation of hydrolyzer design improvements made at Gavin

AOD Installation - Mountaineer Plant

AOD System Design at Mountaineer

Unloading system accommodates dump truck delivery of dry urea

- More tolerant of lumps and agglomerates
- Rapid unloading
- Avoids dry storage
- Eliminates specialty pneumatic transfer vehicles

High Speed, High Capacity Dissolving Tanks

- High throughput of urea
- Proprietary mixing technology
- More precise control of urea solution concentration
- Minimizes time urea remains as a solid

AOD Installation - Mountaineer Plant

AOD System Design at Mountaineer

Large urea solution and recycle storage tanks

- Provides 5 days of solution at design ammonia capacity
- External heating of recycle tank
- Allows on-line maintenance of unloading, mixing systems
- Uniform concentration means smoother operation of hydrolyzer

AOD Installation - Mountaineer Plant

AOD System Design at Mountaineer

2 x 100% capacity hydrolyzers

- Simpler control system
- More rapid response
- Reduced capital and installation cost

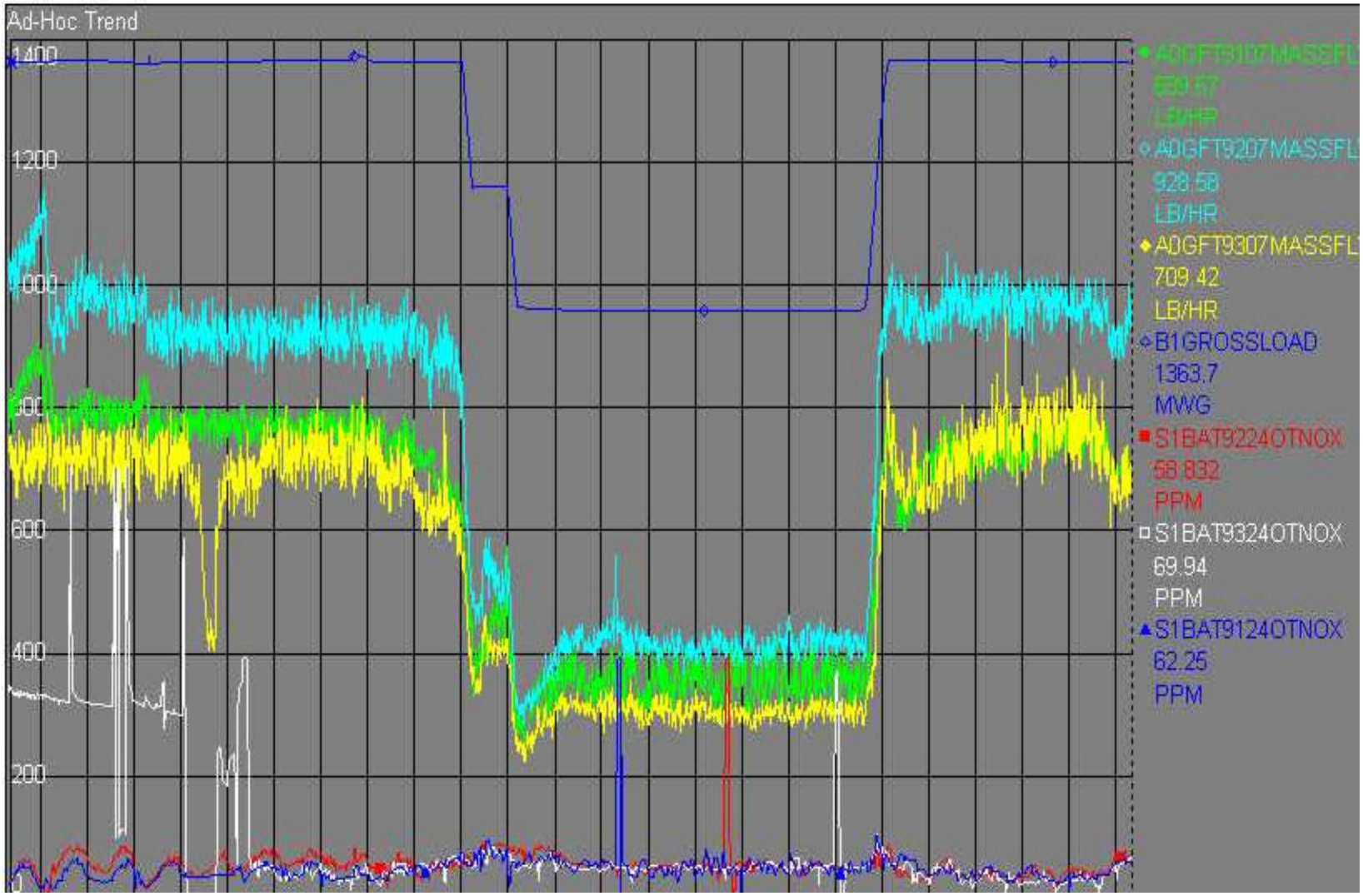
Hydrolyzer Design Improvements

- Better internal gas/liquid separation
- Improved sparge steam design
- Redesigned pressure and level measurement instruments

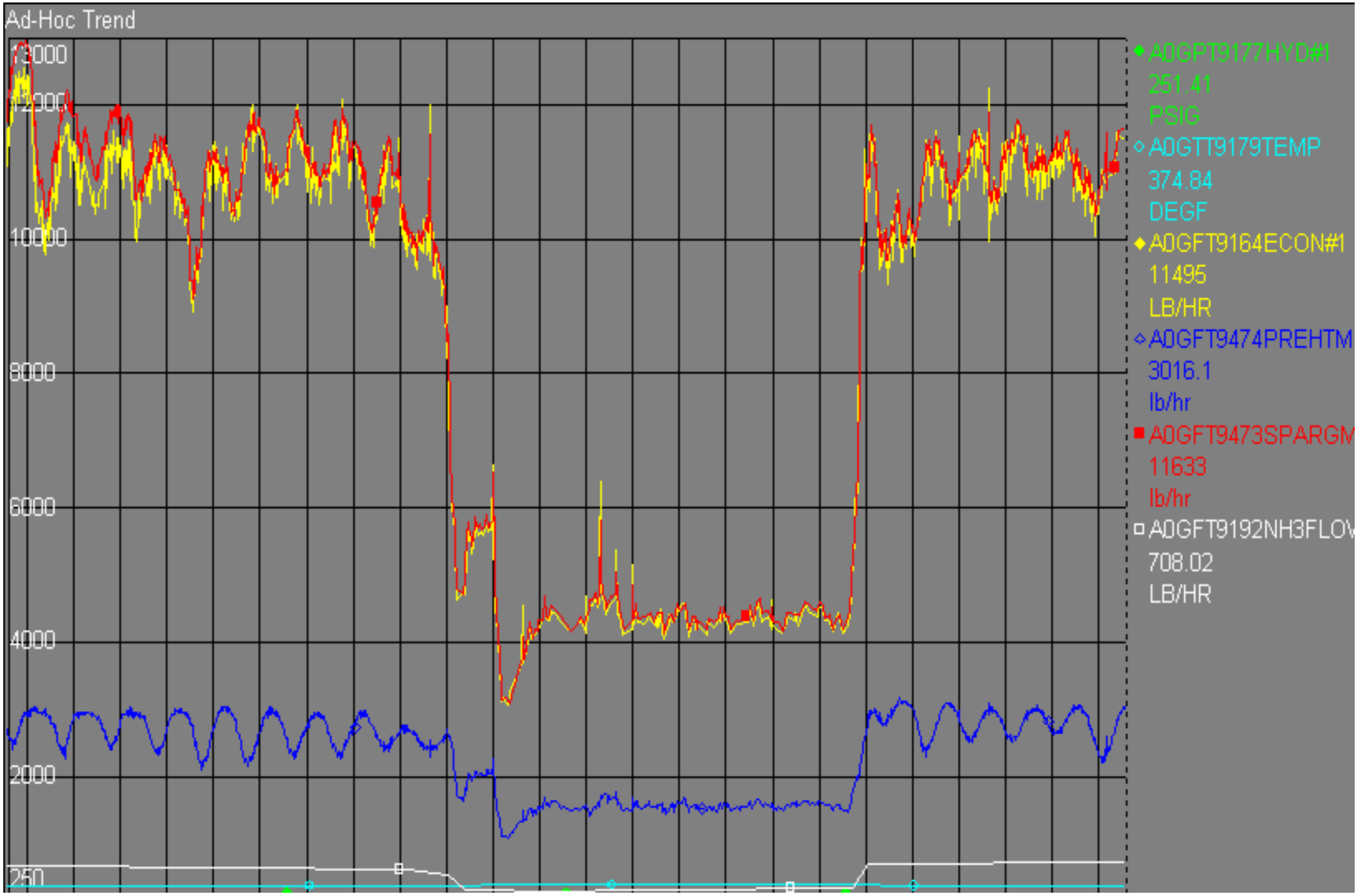
Preliminary Operating Results from Mountaineer Startup

- Equipment delivered to site February, 2002
- Installation substantially complete April 9, 2002
- First ammonia production April 30, 2002
- Achieved NOx reduction target May 1, 2002
- Dry urea handling system started up May 7, 2002
- Currently in full operation with 90% NOx removal

NOx Reductions During Variable Load



Hydrolyzer Operating Conditions



AOD System Standard Designs

4,000 lbs/hr ammonia

8 Units at Gavin, Amos and Cardinal

2,000 lbs/hr

12 units at Mountaineer, Cardinal, Big Sandy, Kyger Creek and Clifty Creek

1,000 lbs/hr

600 lbs/hr

1 unit at Mirant Canal Station

250 lbs/hr

Conclusions

- Design improvements resulting from operating experience at Canal and Gavin have been incorporated into standard designs applied to Amos and Mountaineer
- These improvements have resulted in reduced capital and installation costs for the AOD systems at AEP's Mountaineer and Amos plants
- The new approach to urea handling and storage resulted in a simpler system with expected reduced operating and maintenance costs
- Design improvements have already proven effective in simpler startup with fewer problems, smoother operation and fewer operating problems